



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,403	10/15/2003	Hideki Kuwajima	2003_1435A	4372
513 7590 05/15/2007 WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021			EXAMINER RENNER, CRAIG A	
			ART UNIT 2627	PAPER NUMBER
			MAIL DATE 05/15/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/684,403

Applicant(s)

KUWAJIMA ET AL.

Examiner

Craig A. Renner

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2006 & 20 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 2,5,12-17 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-11,18,19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2006 & 20 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 2, 5, 12-17 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 08 June 2006.

Drawings

2. Replacement drawings were received on 06 November 2006 and supplemental replacement drawings were received on 20 February 2007. These drawings are accepted.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following is suggested:

--DISK DRIVE PIEZOELECTRIC ACTUATOR WITH COUPLING PORTION
EXTENDING ACROSS SLIT BETWEEN FLEXIBLE SUBSTRATES--.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3, 4, 6-11, 18, 19 and 21-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. In lines 10-11 of claim 1, it is indefinite as to whether "said flexible substrate" refers to that set forth in line 2 of claim 1, that set forth in lines 3-4 of claim 1, or that set forth in line 4 of claim 1.

b. Claims 3, 4, 6-11, 18, 19 and 21-25 inherit the indefiniteness associated with independent claim 1 and stand rejected as well.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi et al. (US 2002/0017014).

Takeuchi et al. (US 2002/0017014) teaches a piezoelectric actuator (1) comprising a flexible substrate (includes 6 and 7) separated by a slit (8) so as to form two separate flexible substrates (6 and 7) in a same plane (i.e., a same plane intersects both flexible substrates), the two flexible substrates comprising a first flexible substrate (6) and a second flexible substrate (7) that are separated from each other (as shown in

Fig. 15, for instance); a first piezoelectric element unit (right-most 2) disposed on the first flexible substrate; a second piezoelectric element unit (left-most 2) disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit (as shown in Fig. 15, for instance) such that the first and second piezoelectric element units are separated from each other by the slit (as shown in Fig. 15, for instance); and a coupling portion (12, for instance) operable to couple the separated first and second flexible substrates across the slit (as shown in Fig. 15, for instance) [as per claim 1]; wherein the coupling portion is provided at a position corresponding to an antinode of a primary bending mode of the first piezoelectric element unit and the second piezoelectric element unit each being fixed at both ends thereof, respectively (as shown in Fig. 15, for instance) [as per claim 3]; wherein the thickness of the coupling portion is larger than the width of the coupling portion (as shown in Fig. 15, for instance) [as per claim 7]; and wherein the first piezoelectric element unit and the second piezoelectric element unit each have a thin film piezoelectric body (2c), respectively [as per claim 9].

8. Claims 1, 8, 9, 11, 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Inagaki et al. (US 2002/0012194).

Inagaki et al. (US 2002/0012194) teaches a piezoelectric actuator comprising a flexible substrate (31) separated by a slit (between 31A and 31B) so as to form two separate flexible substrates (31A and 31B) in a same plane (i.e., a same plane intersects both flexible substrates), the two flexible substrates comprising a first flexible

Art Unit: 2627

substrate (31A) and a second flexible substrate (31B) that are separated from each other (as shown in FIG. 2, for instance); a first piezoelectric element unit (40A) disposed on the first flexible substrate; a second piezoelectric element unit (40B) disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit (as shown in FIG. 2, for instance) such that the first and second piezoelectric element units are separated from each other by the slit (as shown in FIG. 2, for instance); and a coupling portion (31D) operable to couple the separated first and second flexible substrates across the slit (as shown in FIG. 2, for instance) [as per claim 1]; wherein the first piezoelectric element unit and the second piezoelectric element unit make a displacement in opposite directions (P and Q) with respect to each other (as shown in FIG. 4, for instance) [as per claim 8]; wherein the first piezoelectric element unit and the second piezoelectric element unit each have a thin film piezoelectric body, respectively (lines 3-6 in paragraph [0080], for instance) [as per claim 9]; and wherein the piezoelectric actuator is a component of a disk drive (1500) comprising a disk (1503); a head slider (11) equipped with a magnetic head (1); a flexure (1510/20) to fix the head slider; an arm (1501) to be fixed with the flexure; a first positioning means (includes 1502, for instance, in at least an equivalent structural sense) to move the arm roughly; and a second positioning means (includes 40, for instance, in at least an equivalent structural sense) to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator [as per claim 11, 23 and 24].

Art Unit: 2627

9. Claims 1, 4, 6, 8-11, 19, 21 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuwajima et al. (US 2001/0021086).

Kuwajima et al. (US 2001/0021086) teaches a piezoelectric actuator comprising a flexible substrate (8, lines 5-7 in paragraph [0138], for instance) separated by a slit (between 8D and 8E) so as to form two separate flexible substrates (8D and 8E) in a same plane (i.e., a same plane intersects both flexible substrates), the two flexible substrates comprising a first flexible substrate (8D) and a second flexible substrate (8E) that are separated from each other (as shown in FIG. 4, for instance); a first piezoelectric element unit (11A) disposed on the first flexible substrate; a second piezoelectric element unit (11B) disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit (as shown in FIG. 4, for instance) such that the first and second piezoelectric element units are separated from each other by the slit (as shown in FIG. 4, for instance); and a coupling portion (8C) operable to couple the separated first and second flexible substrates across the slit (as shown in FIG. 4, for instance) [as per claim 1]; wherein the coupling portion is composed of a wiring material (13C) provided on the flexible substrate [as per claim 4]; wherein the wiring material is in common use for the first piezoelectric element unit and the second piezoelectric element unit (paragraph [0108], for instance) [as per claim 6]; wherein the first piezoelectric element unit and the second piezoelectric element unit make a displacement in opposite directions with respect to each other (as shown in FIGS. 10, 20, 21A, 21B, 22A and 22B, for instance) [as per claim 8]; wherein the first piezoelectric element unit and the second piezoelectric element unit each have a thin

Art Unit: 2627

film piezoelectric body, respectively (lines 1-2 in paragraph [0105], for instance) [as per claim 9]; wherein the first piezoelectric element unit and the second piezoelectric element unit form a multilayered structure (310) using two thin film piezoelectric element bodies (includes 311A and includes 311B), each of the bodies comprising a thin film piezoelectric element (311A, or 311B) covered by a metal coating layer (312A and 312B, or 312C and 312D) on top and bottom surfaces of the bodies (as shown in FIG. 33, for instance), with an adhesive layer (313) sandwiched between the top and bottom surfaces of the bodies (as shown in FIG. 33, for instance) [as per claim 10]; and wherein the piezoelectric actuator is a component of a disk drive (paragraph [0002], for instance) comprising a disk (line 11 in paragraph [0092], for instance); a head slider (2) equipped with a magnetic head (1); a flexure (4) to fix the head slider; an arm (line 5 in paragraph [0087], for instance) to be fixed with the flexure; a first positioning means (line 3 in paragraph [0129], for instance, in at least an equivalent structural sense) to move the arm roughly; and a second positioning means (includes 11A and 11B, for instance, in at least an equivalent structural sense) to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator [as per claim 11, 19, 21 and 23-25].

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2627

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 11, 18, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 2002/0017014).

Takeuchi et al. (US 2002/0017014) teaches the piezoelectric actuator as detailed in paragraph 7, supra, further wherein the piezoelectric actuator is used with a magnetic head (line 7 in paragraph [0089], for instance). Takeuchi, however, remains silent as to the piezoelectric actuator and the magnetic head being components of a disk drive comprising a disk, a head slider equipped with the magnetic head, a flexure to fix the head slider, an arm to be fixed with the flexure, a first positioning means to move the arm roughly, and a second positioning means to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator.

Official notice is taken of the fact that it is notoriously old and well known in the art to have a piezoelectric actuator and a magnetic head be components of a disk drive comprising a disk, a head slider equipped with the magnetic head, a flexure to fix the head slider, an arm to be fixed with the flexure, a first positioning means to move the arm roughly, and a second positioning means to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator, in the same field of endeavor for the purpose of enabling information storage/retrieval. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have had the piezoelectric actuator and the

Art Unit: 2627

magnetic head of Takeuchi et al. (US 2002/0017014) be components of a disk drive comprising a disk, a head slider equipped with the magnetic head, a flexure to fix the head slider, an arm to be fixed with the flexure, a first positioning means to move the arm roughly, and a second positioning means to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator. The rationale is as follows:

One of ordinary skill in the art would have been motivated to have had the piezoelectric actuator and the magnetic head of Takeuchi et al. (US 2002/0017014) be components of a disk drive comprising a disk, a head slider equipped with the magnetic head, a flexure to fix the head slider, an arm to be fixed with the flexure, a first positioning means to move the arm roughly, and a second positioning means to make the head slider fixed on the arm perform a fine displacement, wherein the second positioning means is the piezoelectric actuator since such enables information storage/retrieval.

Response to Arguments

12. Applicant's arguments filed 06 November 2006 have been fully considered but they are not persuasive.

The applicant argues that "the piezoelectric units 2 of Takeuchi are clearly not disclosed or suggested as being provided in the same plane" (emphasis added by applicant). This argument, however, is not found to be persuasive as the claims do not set forth "the piezoelectric units ... being provided in the same plane." See 37 CFR §

Art Unit: 2627

1.111(b). The claims merely set forth “two flexible substrates in a same plane.”

Takeuchi teaches two flexible substrates (6 and 7) in a same plane (i.e., a same plane intersects both flexible substrates). Note that the terminology “in a same plane” does not necessarily mean --along a same plane--, but may be broadly construed to mean --including or intersected by a same plane--.

The applicant further contends that “Takeuchi clearly does not disclose or suggest a coupling portion operable to couple the separated first and second flexible substrates across the slit and to suppress a wavy resonance phenomenon of the flexible substrate” (emphasis added by applicant). This argument, however, is not found to be persuasive as Takeuchi teaches a coupling portion (12, for instance) operable to couple separated first and second flexible substrates (6 and 7) across a slit (8). With respect to the intended use limitation, note that a recitation with respect to the manner in which a claimed apparatus (i.e., “coupling portion,” for instance) is intended to be employed (i.e., “to suppress a wavy resonance phenomenon of the flexible substrate”, for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, *Ex parte Masham*, 2 USPQ2d 1647 (PTO BPAI 1987). Nevertheless, since the coupling portion of Takeuchi is structurally no different than that claimed by applicant, it would suppress a wavy resonance phenomenon of the flexible substrate to at least some extent. Applicant has provided no evidence to the contrary.

The applicant additionally asserts that “neither Inagaki nor Kuwajima I disclose or suggest a coupling portion operable to couple the separated first and second flexible

substrates across the slit and to suppress a wavy resonance phenomenon of the flexible substrate, where the first and second flexible substrates are separated from each other in a same plane, and where a second piezoelectric element unit is disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit such that the first and second piezoelectric element units are separated from each other by the slit" (emphasis added by applicant). This argument, however, is not found to be persuasive as Inagaki teaches a coupling portion (31D) operable to couple separated first and second flexible substrates (31A and 31B) across a slit (between 31A and 31B), where the first and second flexible substrates are separated from each other in a same plane (i.e., a same plane intersects both flexible substrates), and where a second piezoelectric element unit (40B) is disposed on the second flexible substrate approximately in parallel with a first piezoelectric element unit (40A) such that the first and second piezoelectric element units are separated from each other by the slit (as shown in FIG. 2, for instance). This argument, however, is also not found to be persuasive as Kuwajima teaches a coupling portion (8C) operable to couple separated first and second flexible substrates (8D and 8E) across a slit (between 8D and 8E), where the first and second flexible substrates are separated from each other in a same plane (i.e., a same plane intersects both flexible substrates), and where a second piezoelectric element unit (11B) is disposed on the second flexible substrate approximately in parallel with a first piezoelectric element unit (11A) such that the first and second piezoelectric element units are separated from each other by the slit (as shown in FIG. 4, for instance). With respect to the intended use limitation, note that a

Art Unit: 2627

recitation with respect to the manner in which a claimed apparatus (i.e., "coupling portion," for instance) is intended to be employed (i.e., "to suppress a wavy resonance phenomenon of the flexible substrate", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra. Nevertheless, since the coupling portion in each of Inagaki and Kuwajima is structurally no different than that claimed by applicant, it would suppress a wavy resonance phenomenon of the flexible substrate to at least some extent. Applicant has provided no evidence to the contrary.

The applicant lastly maintains that "Takeuchi, Inagaki and Kuwajima I clearly do not disclose or suggest that the coupling portion as recited in claim 1 is further: (1) provided at a position corresponding to an antinode of a primary bending mode of the first piezoelectric element unit and the second piezoelectric element unit each being fixed at both ends thereof, respectively, as recited in claim 3; (2) composed of a wiring material provided on the flexible substrate, as recited in claim 4; and (3) provided across the separated first and second flexible substrates, and the thickness of the coupling portion is larger than the width of the coupling portion, as recited in claim 7." This argument, however, is not found to be persuasive as Takeuchi teaches a coupling portion (12, for instance) provided at a position corresponding to an antinode of a primary bending mode of a first piezoelectric element unit (right-most 2) and a second piezoelectric element unit (left-most 2) each being fixed at both ends thereof, respectively (as shown in Fig. 15, for instance), and provided across separated first and second flexible substrates (6 and 7), and the thickness of the coupling portion is larger

than the width of the coupling portion (as shown in Fig. 15, for instance), and Kuwajima teaches a coupling portion (8C) composed of a wiring material (13C) provided on the flexible substrate (as shown in FIG. 4, for instance).

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

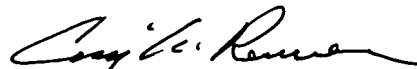
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

Art Unit: 2627

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Craig A. Renner
Primary Examiner
Art Unit 2627

CAR